

U.S. Patent Application No. 09/654,182
Amendment dated September 15, 2006
Reply to Office Action of June 15, 2006

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A chromatography column comprising a column having a stationary phase and a mobile phase, wherein said stationary phase comprises carbonaceous material having attached at least one organic group, and wherein the carbonaceous material is particles having a size of from about 1 micron to about 500 microns.

2. (Original) The chromatography column of claim 1, wherein said organic group comprises at least one aromatic group directly attached onto the carbonaceous material.

3. (Original) The chromatography column of claim 1, wherein said organic group comprises at least one alkyl group directly attached onto the carbonaceous material.

4. (Original) The chromatography column of claim 1, further comprising a substance comprising chemical species to be separated in said column.

5. (Currently amended) A separation device comprising a mobile phase and a stationary phase, wherein said stationary phase comprises carbonaceous material having attached at least one organic group, and wherein the carbonaceous material is particles having a size of from about 1 micron to about 500 microns.

6. (Currently amended) A method for conducting separation of chemical species from a substance, wherein said method comprises passing said substance through a system containing a mobile phase and a stationary phase, wherein said stationary phase comprises carbonaceous material having attached at least one organic group, and wherein the carbonaceous material is

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particles having a size of from about 1 micron to about 500 microns.

7. (Original) The method of claim 6, wherein said separation is chromatography.

8. (Original) The method of claim 6, wherein said separation is size exclusion chromatography.

9. (Original) The method of claim 6, wherein said separation is chromatography by affinity wherein the chemical species in the substance have different affinities for the stationary phase.

10. (Original) The method of claim 6, wherein said separation is an adsorption-desorption chromatography.

Claims 11-15 (Canceled)

16. (Previously presented) The chromatography column of claim 1, wherein the organic group is a phenyl or naphthyl group having ionic or ionizable groups.

17. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises an amino acid or derivatized amino acid, cyclodextrin, immobilized protein, polypeptides, or combinations thereof.

18. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises a $-C_6F_5$ group, a trifluoromethyl-phenyl group, a bis-trifluorophenyl group, or combinations thereof.

19. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises $-Ar-(C_nH_{2n+1})_x$ group, wherein n is an integer of from about 1 to about 30 and x is an integer of from about 1 to about 3.

20. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises cyclodextrin attached through an alkyl group.

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21. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises polyethylene glycol or methoxy-terminated polyethylene glycol or derivatized resins thereof.

22. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{COOX})_m$, wherein Ar is an aromatic group, n is 0 to 20, m is 1 to 3, and X is H, a cation, or an organic group.

23. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises $\text{Ar}-((\text{C}_n\text{H}_{2n})\text{OH})_m$, wherein Ar is an aromatic group, n is 0 to 20, m is 1 to 3.

24. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{NH}_2)_m$, wherein n is 0 to 20, m is 1 to 3, or its protonated form: $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{NH}_3\text{X})_m$, wherein X is an ion, and Ar is an aromatic group.

25. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{CHNH}_3^+\text{COO}^-)_m$ and the reaction products thereof with molecules containing functional groups terminated in $-\text{NH}_2$, $-\text{OH}$, or $-\text{COOH}$, wherein Ar is an aromatic group and n is 0 to 20.

26. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{CH}=\text{CH}_2)_m$, wherein n is 0 to 20, m is 1 to 3 or $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{SO}_2\text{CH}=\text{CH}_2)_m$, where n is 0 to 20 and m is 1 to 3.

27. (Previously presented) The chromatography column of claim 1, wherein the organic group comprises at least one chiral ligand group.

28. (Previously presented) The chromatography column of claim 16, further comprising a second organic group attached on the carbonaceous material.

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29. (Previously presented) The chromatography column of claim 17, further comprising a second organic group attached on the carbonaceous material.

30. (Previously presented) The chromatography column of claim 18, further comprising a second organic group attached on the carbonaceous material.

31. (Previously presented) The chromatography column of claim 19, further comprising a second organic group attached on the carbonaceous material.

32. (Previously presented) The chromatography column of claim 20, further comprising a second organic group attached on the carbonaceous material.

33. (Previously presented) The chromatography column of claim 21, further comprising a second organic group attached on the carbonaceous material.

34. (Previously presented) The chromatography column of claim 22, further comprising a second organic group attached on the carbonaceous material.

35. (Previously presented) The chromatography column of claim 23, further comprising a second organic group attached on the carbonaceous material.

36. (Previously presented) The chromatography column of claim 24, further comprising a second organic group attached on the carbonaceous material.

37. (Previously presented) The chromatography column of claim 25, further comprising a second organic group attached on the carbonaceous material.

38. (Previously presented) The chromatography column of claim 26, further comprising a second organic group attached on the carbonaceous material.

39. (Previously presented) The chromatography column of claim 28, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

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40. (Previously presented) The chromatography column of claim 29, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

41. (Previously presented) The chromatography column of claim 30, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

42. (Previously presented) The chromatography column of claim 31, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

43. (Previously presented) The chromatography column of claim 32, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

44. (Previously presented) The chromatography column of claim 33, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

45. (Previously presented) The chromatography column of claim 34, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

46. (Previously presented) The chromatography column of claim 35, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

47. (Previously presented) The chromatography column of claim 36, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

48. (Previously presented) The chromatography column of claim 37, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

49. (Previously presented) The chromatography column of claim 38, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.